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# The Benefits Derived . . .

## From The Practical Use Of Scientific Facts In Citrus Culture

By H. A. Thullbery, Lake Wales, Fla.,  
At Meeting of Florida State Horticultural Society

Let us first determine just what we mean by Scientific Facts.

Every now and then we have a salesman call at our office representing a company whose research department has developed a product that will do everything from giving the citrus bloom a better aroma to curing psoriasis. Our first question is: "Has the U. S. D. A. or the Experiment Station approved it?" When the answer is "No," and it usually is, there is no sale.

This is not the kind of research we wish to discuss. There are many reputable companies doing a great work thru their research departments, but you will always find them working in close collaboration with our State and Federal Agricultural Departments.

Also, we know of growers who get a very complete analysis of their soil, forgetting all else and believing themselves to be ultra-scientific. They take this to their County Agent or to the Experiment Station, expecting them to make a recommendation for fertilizer, and are surprised when they are told it is preferable to see the grove and know its history for at least two or three years before making recommendations.

By the practical use of Scientific Facts we mean taking those basic

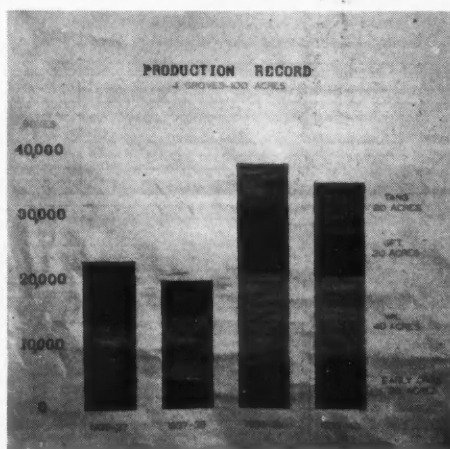
facts given out or approved by the United States and State Agricultural Departments and applying them to our own particular problems.

In our opinion there are too many growers that think the duty of the Experiment Station is to give them a "hard and fast" recipe for growing Valencias, another for Hamlins

would like to point to some concrete facts taken from records in our work with the Haines City Citrus Growers Association.

We have in this work, endeavored in every way to keep in touch with our agricultural departments, as to their latest findings and adapt these to our practical use.

For example, we regularly keep a close check on the pH of the soil and attempt to keep it around 6. When it goes below, we apply dolomite and when we find it much over this figure, we use acid forming materials in our fertilizer to correct. Zinc sulphate is regularly applied in our early sprays each year. Manganese and copper, for their tonic value, are used as their need is indicated, either in the spray or fertilizer program. Magnesium is used in the form of dolomite until the pH is around 6. The balance of the magnesium requirement is in the form of soluble magnesium added to the fertilizer formula. After the



and so on, regardless of conditions. We agree with the one who said that the growing of citrus is an art as well as a science, but we also believe rapid strides have been made the last few years toward making it an exact science.

As to the benefits of the practical use of these scientific facts, we

pH goes above 6 the entire magnesium requirements are furnished in the soluble form. Due to the heavy demands for this element, we have found that dolomite can not be relied upon under very heavy cropping and soluble magnesium up to four units in the mixed fertilizer have paid

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# The College Of Agriculture Of The University Of Florida

DR. WILMON NEWELL

Provost for Agriculture, University of Florida

Believing that you should know as much as possible about the agricultural agencies — your agricultural agencies — that are serving you, it is my intention to discuss with you about some of them, their duties, and services.

In my first paper I have decided to discuss the College of Agriculture of the University of Florida, and, in later talks, I will show how this institution cooperates with others.

We may consider the College of Agriculture as a unit of the University of Florida with three divisions or parts.

The first division is teaching and is composed of professors who teach agricultural subjects to students in the University. As you perhaps know, these professors teach agronomy, horticulture, agricultural chemistry, agricultural economics, entomology, animal husbandry, and other subjects pertaining to Florida farming.

In their teaching, College of Agriculture professors endeavor to give as much useful information to their students as they can in class and in the field. Insofar as field work is concerned, I might point out that the teaching division's policy includes stressing actual field work in connection with classroom study. In other words, professors require their students to collect and study insects, work with livestock, raise vegetable crops, and actually perform the practices they study in class.

Professors strive at all times to give their students information and suggestions that will be of value to them when they return to their farms or take up other agricultural work.

Next, we consider the research division of the College of Agriculture. The research division, or State Experiment Station system, as it is known, consists of scientists whose duty is to study Florida agricultural problems and work out solutions for them. This division of the College of Agriculture is not confined to the University here in Gainesville. The main research station, of course, is on the Florida campus in Gainesville, but there are branch stations at Quincy, Lake Alfred, Belle Glade,

and Homestead, and field stations or laboratories at Leesburg, Plant City, Hastings, Monticello, and Bradenton. An additional station is to be established in Hardee County, near Waucho, in the near future for the study of range cattle problems.

In the main station here in Gainesville we have scientists working on problems of agronomy, animal husbandry, soils, agricultural economics, home economics, entomology, horticulture, and plant pathology, while workers at the branch and field stations are studying problems affecting crops in those particular areas. Some of the agricultural problems that have been solved by Experiment Station workers include "salt sick" and "sweeny" of cattle, proper cultivation of tung trees, crack stem of celery, citrus insect control, mineral deficiencies in Everglades soils, plant disease control, and development of certain crops or varieties for certain areas.

From the research division or Experiment Stations of the University of Florida College of Agriculture we go to the extension division of the institution. Perhaps most of you are more familiar with this division of the College of Agriculture than the two others, as the county and home demonstration agents, its representatives, are working with you all the time.

The extension division of the College of Agriculture consists of agricultural and home demonstration specialists and county and home demonstration agents. Each county and home demonstration agent is a representative of the University of Florida College of Agriculture. He or she is employed cooperatively by the College of Agriculture, the United States Department of Agriculture, and the county in which he or she is working. The college pays part of the agent's salary from state and federal funds, and the county pays the rest.

At present there are 59 county agents and 36 home demonstration agents. Headquarters for the work of county agents are the University here in Gainesville, while headquarters for home demonstration work are in Tallahassee — at the Florida

State College for Women. While headquarters for home demonstration work are in Tallahassee, all county and home demonstration work is carried on under the over-all supervision of the director of extension of the College of Agriculture of the University of Florida.

Now that I have explained the setup of the three divisions of the College of Agriculture — teaching, research, and extension, let us consider the correlation or working together of their programs.

The teaching division teaches rural boys — who are students in the College — how to employ scientific methods in their farming, the principles of agricultural economics, including the law of supply and demand, marketing details, and other things which will enable them to enjoy a maximum of success and happiness in their work on the farm or elsewhere.

The research division, or Experiment Station system, is continually working to solve Florida agricultural problems and improve farming methods.

The extension division, along with the teaching division, receives the results of experiments carried out by research scientists and conveys them to the farm people and assists them in putting the improved methods into practice. Extension representatives — the county and home agents — work with farmers and farm people in their own communities and advise them of the best methods as worked out by experiment station scientists.

Thus, I have explained to you how the College of Agriculture works, how its three divisions teach, experiment, and disseminate information to rural people. The work is correlated and each division is more or less dependent on the other. The teaching and extension divisions receive the results of research workers and convey them to students and farmers. Without research, the information that extension and teaching division workers could give out would be far from complete or applicable. Without extension and teaching, the research division would not be able to transmit its results as effectively to

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# NITROGEN...

## From Legumes

By H. Harold Hume

For their growth, many different substances are needed by plants. Some of these are used in larger amounts than are others and, three—Nitrogen, Phosphorus and Potash—are regarded as being more important than others. However, there are two facts that must be borne in mind in relation to the relative values of plant foods. The first is that all substances needed for growth are necessary, even though some of them are required only in very small amounts and second, that the growth of plants will be limited by deficiencies, even though amounts required are very small. However, since nitrogen is so largely responsible for good plant growth and since it is so readily carried away in drainage water or lost in the air, when plants or animals in the soil rot or decay, particular attention must be given to the end that the supply is always large enough to meet the needs of growing plants. Nitrogen may be secured from nitrate of soda or sulphate of ammonia or cottonseed meal, or from many other commercial sources. All of these have their place.

There is, however, everywhere a tremendous source of supply for nitrogen, to which the grower must always give attention if he is to be a successful grower. That source of supply is in the air. It is estimated that over every acre of the land surface of his farm, there are 145,000 to 150,000 tons of free nitrogen. Some of this free nitrogen is carried to the soil during electrical storms and larger amounts are made available to plants through the action of soil bacteria.

It has been found that certain organisms are associated with the roots of some kinds of plants. Long, long ago it was noted that a better crop of grain, for instance, could be produced if the grain crop followed a crop of beans or peas. But it was not until very recent years that the reason for this was found out.

There is a large group of plants known as legumes. Beans and peas already mentioned are legumes. In Florida there are many wild or native ones—beggarweeds, coffee weeds, lupines and ground nuts—to mention only a few, while others have been introduced and are cultivated—as the cowpea, velvet bean,

crotolaria, clover, peanut and bean—for examples. These plants normally have minute living organisms associated with their roots and through them the free nitrogen of the air is collected and used by the plants, later to be returned to the soil when the plants or their parts decay.

Let us go out into a field of beggarweed, or cowpeas or crotolaria where the plants are dark green and the growth rank and vigorous, and pull up some of the plants. First, let us loosen the soil with a shovel that most of the roots will come up when the plants are pulled. Now look at the roots and we see that there are small growths, usually round though sometimes branched, loosely attached to them. These growths, commonly called **nodules**, are there because certain bacteria are associated with the roots. The bacteria live in the nodules, secure free nitrogen from the air and the plant uses it as it grows. All very simple and of tremendous value in making soil richer in nitrogen, for when the crop of legumes is returned to the soil, the nitrogen goes to feed other plants. Good crops result to the great advantage of the grower. How much nitrogen is gathered in this way? The amount varies of course though it is largely related to the amount of the crop. But a ton of cowpeas has about 62 pounds of nitrogen in it and a heavy crop of crotolaria would have twice that much or more in an acre crop. Compare this with an application of one ton to an acre of a fertilizer analyzing 4-7-4. This fertilizer would contain 80 pounds of ammonia or approximately 66 pounds of nitrogen. From this we have an idea of the value of legumes and their associated bacteria as nitrogen collectors. The good crop of crotolaria would contain twice as much nitrogen as a ton of the four percent ammonia fertilizer.

The kind of legume bacteria is not the same for all legumes. Cowpea, crotolaria and peanut (group No. 1) are attended by the same bacteria. But the clovers, White, Red and Burr (group No. 2) for instance require another kind or strain. And other legumes require still other kinds of bacteria. Now it is necessary that the particular strain or kind be

present if satisfactory growth of the legume is to be secured. The bacteria can be put into the soil in two ways. First by using cultures of the bacteria that may be secured from trade sources and second by using soil from a field where a crop of the group legume has been grown. This is called "inoculation" and is done by mixing seed and culture—or soil—or both—just before sowing. So widely and generally have the legumes of group No. 1 been grown in Florida that inoculation is not usually necessary for them. But, for the second group it should be done and in all cases it may be regarded as good crop insurance. Directions for inoculating legumes may be secured from the Florida Agricultural Experiment Station.

One other matter in connection with the growing of legumes. Lime, a phosphatic material and potash are needed as fertilizers and in the establishing of clovers particularly they should be used.

The foundation of good land handling in Florida calls for the growing of legumes as a part of the cropping system. Not only can nitrogen be secured but supplies of humus can be maintained and the benefits that follow are many. To give one outstanding example, the yields of oats at the North Florida Experiment Station have been increased from about 25 bushels per acre to over 40 bushels per acre and the use of a legume in the rotation has been largely responsible for this.

THE COLLEGE OF AGRICULTURE  
CULTURE OF THE UNIVERSITY OF FLORIDA

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students and farmers.

College of Agriculture representatives are in all parts of the state all the time, working to assist the farmer and farm family and improve their living and state as a whole. It can be accurately and truthfully said that the College of Agriculture serves the state—all parts of the state.

People who live on farms and in rural towns constitute 40 percent of the entire population of the United States.



## THE BENEFITS DERIVED . . .

From The Practical Use Of Scientific Facts In Citrus Culture

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regular dividends. Soils are analyzed from time to time for their magnesium and manganese contents after the symptoms of deficiencies have disappeared from the trees. By this method, we hope to not only eliminate the application of these materials where unnecessary, but also to forestall the reappearance of deficiency symptoms by adding materials before the level becomes too low. Well balanced fertilizers are used and we have found, as advised by the Experiment Station, that with the use of the above mentioned materials, we must necessarily reduce the amount of nitrogen in our fertilizer.

A proper spray schedule for pest control has been maintained. While the use of copper for control of melanose has been restricted to grapefruit and some of our older orange groves, in the future we will spray more oranges and tangerines. In our rustmite program, we have found that often one sulphur spray a year can be eliminated by spraying for a light infestation rather than waiting for a heavy one.

In the matter of control of purple scale, regular inspections are made and our program calls for a thorough application of oil when the infestation has reached a light to medium point. This schedule has proven highly beneficial to us due to the lack of heavy dead wood occasioned by the heavier infestation of scale. While the application must be thorough, one treatment brings the scale under control, whereas two oil sprays in one year have been necessary where the scale infestation has been allowed to increase. In addition to this, we can often go one and sometimes two years without an oil spray where we have thoroughly cleaned up a light infestation. The tonic materials, zinc, copper and manganese are added as required in one of the regular spray applications, which eliminates further cost.

Modern and efficient portable and stationary irrigation equipment have also proved their value.

The results of these practices are shown in the records of four groves totalling 100 acres, over the past four seasons. These 100 acres consist of 20 acres of early and mid-sea-

## THE CITRUS INDUSTRY

son oranges, 40 acres of Valencias, 20 acres of seeded grapefruit and 20 acres of tangerines.

First let us look at the production graph. 1936-37 was the heavy crop year for grapefruit. Zinc, copper, magnesium and manganese deficiencies showed in all of these groves at this time. Dolomite had been applied late in the summer of 1936 and possibly a little zinc had been used. The program, as stated above, had been started in the Spring of 1937, and it is doubtful, however, if it had any marked effect upon the crop of 1937-38. During this crop year, Valencias and tangerines showed a light increase and early oranges a slight decrease, but seeded grapefruit dropped to 30 percent of the previous crop, due largely to the heavy magnesium deficiency which existed. In 1938-39 there was an in-

August, 1940

crease over the heavy crop year of 1936-37 of 147 percent in early oranges; 165 percent in Valencias; 218 percent in tangerines, and 158 percent in grapefruit. It was during this crop year that the influence of our program began to be reflected in production. In 1939-40 there was still a slight increase in early oranges, a small decrease in Valencias and a slight gain in tangerines. Grapefruit dropped to 64 percent of the previous crop. The true comparison, however, should be made with the previous short crop year of 37-38, over which we show an increase of 347 percent, and it was even 102 percent of the big crop of 36-37. It is the writer's opinion that continued use of this program will tend to reduce the high yearly fluctuations in the production of seeded grapefruit.

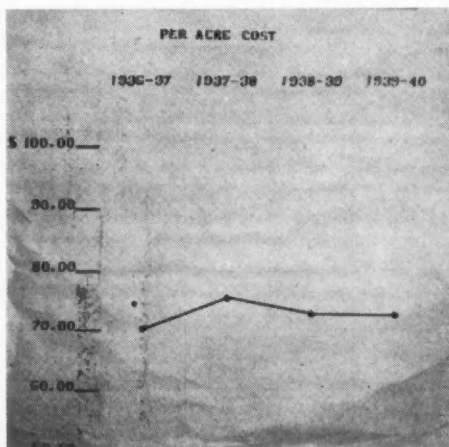
Next, a hurried examination of the acre cost chart shows a very slight variation. The cost ran from \$70 to \$75.

Now, let us examine per box cost. In 1936-37 this cost was \$.3011. In 1937-38, due to the large decrease in grapefruit production and a slight increased acreage cost, the figure rose to \$.3698. In 1938-39 there was a decrease of 50 percent to \$.1869. In 39-40 a slight increase brought it to \$.2021.

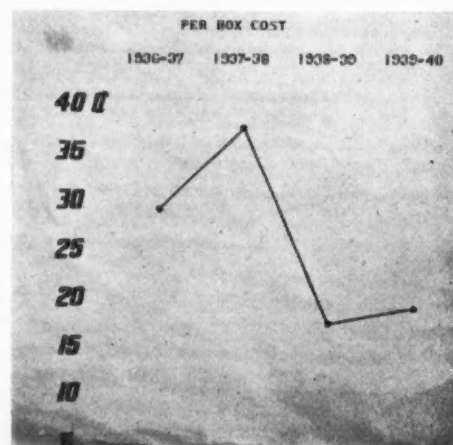
We do not consider these figures exceptional but rather as concrete examples of what is being done by production men in Florida with the advantages of these scientific data. This question, however, naturally arises: If increased production, while bringing on lower production costs, likewise causes lowered selling prices, what have we accomplished? This is a question I am sure the industry will solve eventually to their satisfaction.

As to other benefits, allow me to quote our Association Manager, Mr. L. T. Bice, who says: "We are daily making use of scientific facts in a practical way in our entire program. These facts determined principally thru the fine work of the U. S. D. A. and our own Experiment Station are paying dividends. Increased production, with its consequent lower per box cost, is but the beginning. The attendant superior quality manifested in better grade, size, color and keeping qualities, is easily translated into greater net returns. Burnt stems and stemend decay, while not completely eliminated, have been drastically reduced. The natural color of all varieties has been improved and consequently coloring room treat-

(Continued on page 9)



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## THE BENEFITS DERIVED . . .

From The Practical Use Of Scientific Facts In Citrus Culture  
(Continued from page 8)

ment is minimized. Coloring, waxing and refrigerating problems have all been lessened by the common sense application of facts derived from research."

To illustrate these additional advantages beyond increased production, allow me to take up the long forbidden subject, "tangerines". After all it is the only "closed corporation" Florida has.

When nearly everyone was cutting down tangerines, our growers were blessed with so many they could not afford to do away with them. Something had to be done, so we set out to improve our quality. We applied the same program used on other varieties and gave them our closest attention, with the result, that the big rough, puffy tangerines, with a large protrusion at the stem end, disappeared. We began to grow a firm, smooth, flat, well filled fruit. In the coloring room, our early pickings quickly took on an even, rich color. Decay and spotting, which is so troublesome, was practically eliminated in shipments.

For the crop year 1938-39, the Florida State Marketing Bureau reported an average loss of 7c per box on production cost. During the same year we marketed 55,000 boxes with an average net return of 13c per box above cost of production, or 20c per box above the state average. Our entire crop was marketed.

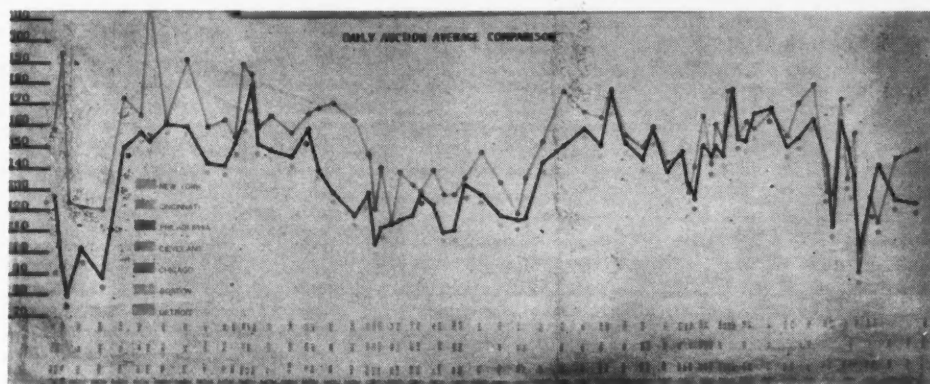
For the season 1939-40, when the state estimate was 15 percent below the previous year, our estimated crop increased to 65,000 boxes. At the time of the freeze, 57,574 boxes had been marketed, 97½ percent were No. 2's and better. As you remember, size 246's and No. 3's could not be shipped from around November 5th until January 15th.

The final justification of any program is the monetary return. I have prepared a graph, showing our average sales price in the various auc-

of all sales shown here was \$1.49½ per 4-5th box. The returns to the growers on all fruit during the entire season, prior to the freeze, was \$1.12 per field box, picking and hauling to be deducted.

All figures used in this graph were taken from the Florida Fruit Digest, commonly known as "The Green Sheet."

All improvement in production will not overcome a faulty marketing division, while the best marketing management can not average good prices for poor fruit. The two must



tions as compared with the total average sales price in the same auction on the same date.

In the seven auctions into which this fruit was placed, we showed a substantial margin over the total average throughout most of the season. Toward the end of the season, when we were cleaning our trees, this margin gradually decreased.

I would call your attention to the fact that these shipments represent over 68,000 — 4-5th nailed boxes or 60 percent of the entire crop picked, the remaining 40 percent having gone to private sales. Also, that these are Polk County "Sand Hill" tangerines, in competition with the balance of the State. The average auction price

go hand in hand. Due credit should be given our Association Manager, Mr. Bice, for excellent handling, packing and market analysis, which helped to make them possible.

In conclusion: Scientific data made available to us thru the various research agencies have proven of vast importance when applied to our citrus problems. In this paper I have endeavored to show that thru such assistance we have been able to increase yield of all varieties of fruit, thereby lowering the cost per box an appreciable amount, as well as enabling us to grow fruit of a quality which thru capable handling and marketing has increased the returns to the grower.

## MAYO'S FARM SAFETY PROGRAM SAVES HUMAN LIVES

Beginning about 3½ years ago, Commissioner Mayo started a "Safety on the Farm" movement.

During 1936 there were 211 fatalities due to farm accidents. The record shows that in 1939 only 77 persons were killed in farm accidents, stated Asher Frank, director of the Florida Safety Council.

Mr. Mayo carried on an extensive survey through the various agencies, inspectors, and others engaged in farming activities. Especially were the vocational teachers, the Future

Farmers, and the 4H clubs active in the work.

Mr. Mayo didn't limit his activities to the reduction of farm accidents only, the farmers were called upon and booklets on "Safety on the Highway" and "Safety in the Home" were left.

The Florida Safety Council addressed various farm and Future Farmer groups. No effort was spared that would bring home to the agriculturists the need for Safety in his operations. Much credit must be given Mr. Mayo for his initiating this "Safety on the Farm" movement.

There were no guide posts to go

by. It was a Safety program that had to be developed from the ground up and the saving of more than 134 lives through his activities in the past 3½ years is sufficient proof of the fine cooperation that was given Mr. Mayo's efforts by the press, individuals, and groups who realized that Safety is common sense.

National recognition of Mr. Mayo's program has been given, and many states have written in for the program. The only "Safety on the Farm" literature displayed at the National Safety Council convention was "Safety on the Farm" by Commissioner Mayo.

# The Citrus Industry

with which is merged The Citrus Leaf

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## NATIONWIDE CITRUS QUOTA PROPOSED

A bill providing for nationwide proration of citrus shipments, affecting all citrus producing areas within the Continental United States, has been prepared for introduction in congress, though as yet it has not been introduced. The bill is understood to have originated in California and is being given serious consideration in Florida and Texas.

The bill, according to its proponents, would not conflict with the present marketing control of grades and sizes in the separate states but would affect California, Texas and Florida alike. It would be an extension of the wheat, rice, cotton and corn quota legislation already already in effect.

The bill employs the same language as the wheat, rice, cotton and corn quota bills and, if enacted, before becoming effective would have to be favorably voted upon by two-thirds of the acreage in all of the states. It provides for the creation of a committee of five to administer it and also provides for the pooling and trading of certificates issued to producers, which certificates could be traded both inter-state and intra-state.

Elimination would be made on a percentage basis. A grower producing low grade fruit, which would not bring profitable returns under prevailing prices, might find it profitable to sell his certificates for his percentage and thus eliminate his crop by disposing of his certificate to the producer of high grade fruit, who could then ship his entire crop.

In case of a freeze, a producer whose crop was injured by the cold could dispose of his crop to a grower who had succeeded in saving his fruit.

The proposal is worthy of careful and painstaking consideration on the part of citrus growers in all of the producing states. Some modifications may be needed to protect the interests of the growers of one state as against the interests of growers in another state, but the idea of nationwide control is basically correct.

Statewide control of grade, size and quota shipments may tend to alleviate some of the marketing ills to which the industry is subject, but state control cannot entirely eliminate those ills. With each state operating under dissimilar control systems, there is nothing to prevent one state flooding markets while the other states are trying to equalize shipments. Nothing short of nationwide control can eliminate that evil.

For more than twenty years this publication

has advocated a uniform system of marketing control which would apply equally to Florida, Texas and California. The present proposal appears to furnish the groundwork for the creation of such a system of control. It behooves the citrus growers of all the producing states to give careful study to the proposed legislation, and if the present bill does not fully cover the needs of the industry to work in close co-operation for the modification or extension of its provisions to the end that national control may do what state control has been unable to accomplish.

Similar national legislation appears to have been successful in the matter of wheat, rice, cotton and corn. Certainly it is worth trying as regards citrus.

## PALESTINE SEEKS CITRUS CONTROL

Right in line with the proposal for a nationwide citrus quota control in the United States, is the effort now being made in Palestine for the creation of a Board of Commissioners to have broad powers in the matter of shipments and distribution.

While the proposal in Palestine, like the proposal in the United States, is still in an embryonic state, the consensus of opinion there appears to favor quota regulations among growers as well as quota shipments to the foreign markets upon which Palestine growers depend for the disposal of their products.

"Hadar," the Palestine citrus publication, states that the low prices received for citrus during the past two years, coupled with the restriction of exports due to the European war, has tended to bring Palestine growers together in an effort to secure governmental control of sales and distribution.

Wherever citrus is grown, the growers are coming to realize the need of greater centralization of control over grade and distribution.

## THE GROWER'S PRIMARY CONCERN

In recent years, citrus organizations, citrus publications, newspapers, the growers themselves have been devoting much attention to marketing problems — which is well. Those problems appeal loudly for solution. But in seeking the remedy for ills which all recognize as existing in the field of marketing, the grower should not lose sight of the fact that his primary concern is with his grove and the production of quality fruit. Without quality fruit, no marketing system can be made a success.

The grower who would hope to benefit by improved marketing systems must be prepared to supply quality fruit. He must feed his trees and protect them from the ravages of pests and disease. Only the grower whose fruit will pass the tests of the consumer's palate will be in position to benefit from better systems of marketing.

Let every grower do all in his power to improve our marketing system and our marketing conditions — but let him also remember that his first concern, and his sole hope of profit, lies in the production of quality fruit.



# The War And Its Effects On Foreign Trade In Agriculture

C. V. NOBLE  
Agricultural Economist  
Florida State Agricultural Experiment Station

In the words of Secretary of Agriculture H. A. Wallace, "Agriculture on the whole is not profiting from the war. Exports of farm products are not increasing and are not likely to increase in the near future. Large groups of producers of important export crops have been shut off from normal world markets." The fundamental reasons he offers for this situation are:

"First, Great Britain and France are reserving their dollar purchasing power in this country to buy airplanes and other armaments which they cannot get elsewhere.

"Second, the allied blockade has effectively shut off exports to Ger-

many-controlled territory.

"Third, our trade with neutral European countries has been badly upset by war."

The background for this statement of our Secretary of Agriculture will be found in the official records of the Bureau of Foreign and Domestic Commerce, covering our foreign trade. During the first seven months of the present fiscal year of that Bureau, beginning July 1, 1939, the total exports of all commodities from the United States increased 23 percent over the similar period of the preceding year. Agricultural exports accounted for between one-fourth and one-fifth of the total ex-

ports, and the total agricultural exports increased but 3 percent during the period under review. This shows how much more rapidly non-agricultural exports have increased since the outbreak of the war than agricultural exports. The leaders in this increase in non-agricultural exports were iron and steel, aircraft, non-ferrous metals, and machine tools.

Turning now to our agricultural exports, let us briefly analyze the 3 percent increase as to how it may be affecting agriculture as a whole. Cotton exports increased in value by 88 percent for the seven months beginning July 1, 1939, over the cor-

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## Your Child Would Not Thrive On A Diet Of Meat Alone

That diet must be made up of balanced foods which are necessary to the building of a healthy body and a keen mind. The same condition prevails in the development of trees and plants —

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# Observations On Protection Of Avocados From Cold Injury

W. F. WARD

At Meeting of Florida State Horticultural Society

There are so many variable factors that may influence the time of firing and the effectiveness of heating avocado groves for protection from cold injury that no hard and fast rule can be given. Some of the variable factors are the following: The varieties or the type of the avocado trees, the size of the trees, distance and manner of planting, location with respect to altitude and slope, condition of the trees with respect to both the physical condition and the state of dormancy, the presence or absence of windbreaks, the amount, variation and velocity of the wind, as well as the degree of cold expected, and the general nature of the weather preceding a cold spell or freeze and that following it. These variable factors have caused many growers to state that no two cold spells are alike and it is extremely difficult to give instructions for prevention of cold injury.

It is known that West Indian varieties, such as the Trapp, Fuchs, and Pollock, will not stand as much cold as the Guatemalan varieties, such as Taylor and Nabal, or some of the hybrid varieties, such as Lula. For West Indian varieties, fires should be started at a somewhat higher temperature than for Guatemalans.

It is questionable if it is profitable to try to protect young avocado trees less than three years old by firing. They should be banked high with dirt, or covered up with straw, hay or litter, just prior to the freeze, and the banks should be removed as soon as the danger of that particular cold spell is over. It is a debatable question whether young avocado trees should remain banked for several weeks at a time, for new sprouts that may form under the bank or the bark of the tree itself will be more susceptible to sunburn or sunscald, than if the banks are left up but a week or two at a time. The cost of banking is comparatively small, and I believe the additional cost of pulling down the banks immediately following a freeze and putting them up again if necessary, is justified.

Large trees with dense foliage and trees planted rather close suffer less from cold than scattering trees or those in poor physical condition.

Good windbreaks are especially de-

sirable if a grove is to be fired on windy nights, but they have some disadvantages also. On a still night or one comparatively still in which the temperature does not get quite cold enough to light the fires, there may be some frost damage adjacent to the break, while none may occur where there is a slight movement of air. Then too, windbreaks take some moisture from adjacent avocado trees, causing slower growth and lighter crops of fruit on such trees, but when all items are considered, I firmly believe that windbreaks are quite desirable and should be maintained.

Perhaps a description of the actual firing of my avocado and lime groves at Avon Park would be more interesting than a general discussion of grove firing. The main block of avocados fired was one 20-acre block of trees ranging in age from 10 to 17 years and planted 70 trees per acre. The grove was surrounded on the north, west and south sides by a closely planted windbreak of Brazilian oaks (*Causserina lepidophloia*), which are about 50 feet high. The east side was open. The grove is planted largely to Lula, Taylor, Nabal, Collinson and Winslowson trees, with a few trees of other varieties. The trees were in a strong, vigorous condition, and the Taylor and Nabal trees were carrying a heavy crop of fruit. All Lula and some of the Taylors had been picked prior to the freeze. It was extremely desirable to save all of the fruit as well as the trees, hence my superintendent was

instructed to start fires in the grove somewhat earlier than normally would have been done. Fires were to be started when the thermometers reached 31 degrees, providing that occurred before 2:00 A. M., or at 30 degrees if that temperature was not reached until near 5:00 A. M. Thermometers in shelters at various parts of the grove were read and the temperatures recorded hourly during the first part of the night and each half hour as the danger point approached until time for starting the fires.

Fat pine wood or light-wood was used for firing. A pile of three sticks was laid in the center of each check on the northwest side of the tree, the pile shaped like a V, with the point of the V pointing southeast. A piece of rosin-batting cross the size of the fist was placed at the point of the V between the sticks, and this was lighted with a safety lighting torch, using a mixture of three-quarters kerosene and one-quarter gasoline. From five to seven additional sticks of wood had been placed by each tree or near each fire.

After firing was started, the thermometers within the grove were watched, but very little time was spent in watching thermometers outside the area being fired, and records inside the grove were not recorded at definite intervals. If the temperature fell below 30 degrees at any place, the fires were built somewhat larger. This was done by shoving the sticks forward or bumping forward with an axe which caused them to burn faster and by adding another



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stick of wood when necessary.

Either two or three lines of fires were lighted first on the north and west sides of the groves, and then each fourth row thereafter was lighted from west to east throughout the grove. If such fires did not hold the temperature up to 30 degrees, the row in the middle between the rows of fires was lighted and then when necessary, the last fires were started. The avocado groves and lime groves were fired for four nights during the cold spell, but the fires were burned in every check only two nights, namely, Saturday and Sunday nights, January 27th and 28th, the coldest time being early the following morning. The other two nights, it was not necessary to light all of the fires to hold the temperature to 29 degrees or 30 degrees. The temperature on the outside of the groves reached 21 degrees to 23 degrees at various thermometers during each of the last two nights, while the temperature inside the groves varied from 28 degrees to 33 degrees at different times during the firing. At no time in the avocado grove surrounded by windbreaks did the temperature go below 29 degrees, but in the lime groves without a windbreak on the west, the temperature dropped to 26 degrees for short periods during gusty spells. There was no damage to foliage whatever by fire in the avocado grove with windbreaks, as the fires burned steadily and the heat and smoke drifted slowly through the foliage, whereas in the lime grove without a windbreak on the west, a large percentage of the trees had the foliage and twigs damaged by the fires which whipped about. It was necessary to have larger fires to hold the temperature up in the lime groves, as the trees were smaller and the wind constantly blew the flames in various directions, carrying the heat away.

During the January freeze we fired part of four nights, burned nearly 400 cords of wood, with a total cost for labor of over \$3000.00, but we saved the foliage, fruit and bloom wood of our citrus nursery, all of our Valencia oranges, limes and avocados, and the fruit alone which has been sold during February and March, has brought over ten thousand dollars net on the tree. Our last avocados were shipped in March, two light pickings of limes have been made since February 15th, and a tremendous bloom has been secured on all oranges, grapefruit and limes, and a good bloom is coming on our avocados.

In our young avocado groves which were not fired, the trees were killed

to the banks, and on one small grove of three to five year old avocados which were not fired, the damage to all limbs was so severe that no bloom will be secured this year and some of the trees were killed to the main trunks. Our grove firing was a very decided success.

Other avocado groves in Highlands and Polk Counties which were not fired, were so severely damaged that no fruit will be produced in 1940 and a small crop in 1941 may result.

The following observations were made and conclusions were drawn from results secured in firing our avocado groves in the freeze of 1934-35 and again in January, 1940.

(1) A number of reliable thermometers should be placed under shelters at strategic locations for properly checking temperatures.

(2) A responsible man should be detailed to read thermometers regularly when a freeze is expected, and keep a record of such readings.

(3) All wood should be laid for fires before the freeze arrives.

(4) All flashlights, lanterns and lighting torches should be checked prior to night of firing to see that everything is in readiness. Have an ample supply of all and of axes and shovels.

(5) Where good, fat lightwood is used for firing and where the sticks are large enough so that 120 or 130 sticks of 4-foot wood make a cord, the three sticks of wood in the original fire will burn three hours and one additional stick per fire is required for each subsequent hour. This averages about one large stick per hour for each fire.

(6) If 60 fires are used per acre, then 1½ cords of wood per acre are used in laying the original fires, and if 6 sticks are placed near each other, an additional 3 cords per acre are required.

(7) For real protection, at least 6 cords of fat wood should be stacked at convenient places near or within the groves to be fired.

(8) Hold in reserve one reliable and experienced man for supervising the re-laying of fires the next morning after firing.

(9) An adequate supply of batting dross should be on hand for starting the fires. From one-half to three-quarters pound of batting dross is usually used to start a fire. It is chopped into pieces with an axe and placed in the proper place as the wood is laid for the fire. Strainer dross is not nearly as satisfactory as batting dross, as it readily falls apart, and in the event the fires are not lighted, it is hard to salvage in the

spring for another season.

(10) If batting dross is not available, then strainer dross or fat pine splinters should be prepared ahead of the time of firing.

(11) Fuel enough for three nights of firing in succession is essential for proper protection. For a more prolonged freeze, the grower may be able to get some additional fuel.

(12) Keep the fires burning until the temperature outside the grove reaches 33 degrees, or until indications are that it will reach 33 degrees in a short time. Putting out fires too soon may result in damaged fruit or trees.

(13) Put out fires promptly at the proper time and thus save fuel. Relay the fires as soon as possible after they are put out so as to be ready for the following night.

(14) Prior to laying the wood for fires in the early winter, all dry litter such as cover crops, grass or leaves should be disced into the soil

(Continued on page 17)

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# The LYONIZER

Department

COMPILED BY THE LYONS FERTILIZER CO.

## Reports of Lyons Field Men

## Lyons Super "X" Brands Proving Most Effective For Florida Growers

### POLK AND HIGHLANDS COUNTIES

J. M. Sample

This section of the state has been viewing plentiful rains along with some very hot weather. While the rainfall has been spotted in places, nevertheless, the general water table is well up.

It has been noticed lately that early varieties of fruit have seemed to stop growing, but while this may be true as to outward appearance and size, the inside of the fruit is maturing and filling out. On nearly all early grapefruit crops it can be seen that the rind is becoming thinner as the juice cells expand.

A great many growers are proceeding with oil sprays wherever the case justifies. While the development of Purple Scale has not reached, as yet, the proportions that were anticipated, they may still increase heavily and a close watch on this should be maintained.

On the whole, it may be said in this section, that we are not getting the usual amount of growth on trees this summer. This seems to be particularly true in the case of early grapefruit, but, generally, there seems to be nothing that can be done about this at present, culturally speaking.

### SOUTHWEST FLORIDA F. W. Scott

Wauchula and Arcadia sections have received some nice rains. Groves in this section are looking very good. On the West Coast, including Ruskin, Bradenton, Sarasota, and Fort Myers, there has been very little rain and groves are not looking as well on this account.

Celery growers around Sara-

For many years past one of the outstanding Brands of fertilizer manufactured and sold by the Lyons Fertilizer Co., has been their Super "X" Brand.

Keeping fully abreast of the latest reliable findings of recognized horticultural experts this company has always adopted every proven aid to the development of better fruit and vegetables in the manufacture of its fertilizers.

Within recent years it has been proven beyond all question that most Florida soils are deficient in certain secondary plant foods, and with the purpose of supplying the need for these secondaries we developed several years ago our Super "X" Brands which are designed primarily to provide these valuable secondary plant food elements wherever they might be needed.

sota are making good progress with their seed beds and growers in that section are very optimistic regarding the coming season.

Considerable acreage is being cleared at Ruskin and to all indications the tomato acreage will be heavier there this fall.

#### Personal

Mr. Steve Griffin of Wauchula, a good Lyons customer for a number of years, has a beautiful grove and an outstanding crop of fruit set for the coming year.

### HILLSBOROUGH AND PIN- ELLAS COUNTIES

C. S. Little

Since the fruit on the trees is beginning to size up it now appears that our crop will not be as light as was predicted a few weeks ago.

As a result of the recent rains

It was the design of our horticulturists to produce in this particular brand of fertilizer a mixture which would not only provide the regular plant foods which Florida vegetation of every sort requires, but to add to this mixture the secondary elements which have proven their ability to produce greater quantities of finer fruits and vegetables.

No manufacturer, of course, can produce such a mixture without adding somewhat to its cost, but the trifle in added cost is always more than offset by the increased yield and improved quality of the crop.

It will pay every Florida grower and trucker to permit one of our field staff to discuss this brand with him before buying his fertilizer for the forthcoming application.

the groves have begun to put on substantial growth and as a whole are now looking very well.

Rust mites are very much in evidence in many places and should be watched very closely. A good many growers are spraying with oil for scale control.

Due to the freeze which left many small dead wood on the trees melanose is very bad in many groves and some growers are mistaking this condition for rust mite damage.

Nutritional sprays and the addition of secondary elements in our fertilizers are bringing out new growth in fine shape in many groves in our section.

**LYONIZE YOUR CROPS —  
and be a Happier, Wealthier Grower when you sell your crops.**

## ADVERTISEMENT — THE LYONS FERTILIZER CO.

## Suggestions for Grove and Farm Care

## PEST CONTROL

Watch scale and whiteflies, particularly where bordeaux mixture was used in the spring. Oil emulsion should be used only where it is absolutely necessary. Keep a watchful eye on rust mite. They are extremely active at this time. Spray or dust with sulphur where rust mite are numerous.

## FERTILIZER

If your trees are beginning to show signs of hunger get in touch with nearest Lyons representative, and place order for fertilizer to insure continued growth of tree and fruit for remainder of summer season.

Plan to make application of regular mixed goods this fall.

## PRUNING

Complete pruning as soon as possible. Be sure to remove all water sprouts. Give old trees special attention for root rot, foot rot, decayed spots, etc.

## GENERAL

Remember that fires always come with the beginning of fall and discontinuance of rains. Hoe out fences as protection against fires later in the season. If cover crop has made unusual growth during past few months it will be well to get out the mowing machine.

Little Bits  
of  
FUN

## JEEPERS WEEPERS

Mrs. Weeps: "I always feel lots better after a good cry."

Mrs. Ditto: "So do I. It sort of gets things out of your system."

Mrs. Weeps: "No, it doesn't get anything out of my system, but it does get things out of my husband."

## GOOD AT LOW TIDE

A man of six feet eight inches applied for a job as a lifeguard.

"Can you swim?" asked the official.

"No, but I can wade like nobody's business."

## RIGHT THOUGH WRONG

Bobby: "Dad, what is intuition?"

Dad: "Intuition, my son, is that strange instinct your mother has which convinces her that she is right even when she is not."

## INSOMNIA CURE

"No," said the old lady behind the counter, "I can't sell you chocolates on Sunday."

"But you've just sold some peppermints," protested the prospective customer.

"That's a different thing. I sell peppermints on Sundays because they takes them to church to eat, and they keeps them awake during the sermon, but chocolates — that's different."

## AND THEN WHAT

Professor: "Er, my dear, what's the meaning of this vase of flowers on the table today?"

Wife: "Meaning? Why, today's your wedding anniversary."

Professor: "Indeed! Well, do let me know when yours is, so I may do the same for you."

Annual Sales  
Meeting Held

The annual sales meeting of the sales force and field staff of the Lyons Fertilizer Company was held July 18th and 20th at Riverside Lodge near Homosassa Springs.

A resume of the work which has been done the past year was discussed and outlines were heard of plans for the coming year.

Particular stress was placed upon the necessity of continuing the policy of the company to render the utmost of service to the growers of the state. "The growers needs," emphasized President W. L. Waring, Jr., "must come before any other consideration. Our desire to make sales must always be predicated upon the actual needs of the growers and upon no other premise."

The meeting also heard A. W. Belleau, assistant General Manager, lay particular stress upon the necessity for each field man to keep his customers fully advised as to the latest authenticated information concerning the value of various secondary plant foods, which the company is using in its mixtures with increasing regularity as the needs of their patrons indicate.

## LYONIZE YOUR CROPS.

Good Season  
In Prospect

Every indication points to a relatively successful season this fall and winter, barring the possibility of unforeseen contingencies.

This statement, of course, is dependent upon the growers keeping their trees and crops in first class condition from now until marketing season opens.

The heavy droppage which occurred the earlier part of the summer apparently did not deplete the total crop as much as was at first feared, while the quality of grapefruit especially appears to be potentially much better than was the case last season.

Insect pests are occasioning the growers considerably more trouble this season than is normally the case, due largely to the freeze, but by far the greater majority of growers are keeping a close watch upon this condition and are spraying regularly and effectively.

The loss of the export market due to the war is going to be a handicap, but the vastly better market which is anticipated in industrial centers and the increase in the demand for canned goods by the army and navy is expected to go a long ways towards equizing the loss of export trade.



# Fertilization . . .

## Of Trees And Shrubs

BY R. D. DICKEY  
Assistant Horticulturist  
Florida Agricultural Experiment Sta.  
University of Florida

The variability of Florida's climate and soils, coupled with the wide diversity of plants used for ornamental purposes, make it impossible to give any general recommendations in regard to fertilization which will fit all conditions and all plants. However, in a general way, the recommendations made will be satisfactory for a large number of plants under many different conditions. Certain important exceptions will be noted later.

The difference between trees and shrubs is essentially one of size and, in many instances, there are plants which are listed under both groups. For the purpose of fertilization, therefore, no distinction will be made between trees and shrubs but, for convenience, the subject will be divided into two parts — fertilization of the soil before planting, and fertilization of the plants after they have been set in their permanent locations.

First, let us consider the fertilization of the soil before planting, for this is a very important point which is too frequently overlooked. The most essential soil condition for the growth of most garden plants is an adequate supply of organic matter, and this can be added most conveniently before the plants are set. The area to be planted should be prepared some time in advance by digging it up thoroughly and mixing with it large amounts of organic matter. Some of the materials used for this purpose are: Compost, well-rotted manures, leaf mold peat moss, muck and leaves. Stable manure and raw muck are objectionable due to the fact that they may contain weed seeds, also, if stable manure is not well-rotted, it will injure the roots of newly set plants. Since there may be some doubt as to what is "well-rotted" stable manure, it would be best to use cow manure since it is safe in this respect. In light, sandy soils, where possible it would be well to remove the soil to a depth of several inches and replace this with a mixture of fertile top soil with compost, cow manure or muck. If available, humus in the form of leaf-mold, peat moss or leaves can be used to good advantage. Bone meal is desirable as an addition to the soil, since it does not injure the roots and will furnish a supply of nutrients over

a long period. In planting bare-rooted trees, one or two handfuls of bone-meal should be applied to the soil about the roots as the hole is being filled. In addition to the plant foods supplied, the addition of organic matter to the soil increases its water-holding capacity and leaching and erosion are reduced. Aeration is increased and bacterial action accompanying decomposition increases the availability of certain plant nutrients.

Next we will discuss the fertilization of trees and shrubs after they have been set in their permanent locations. For this purpose, many different fertilizer formulas and materials are used; however, complete fertilizers which contain from 3 to 6 percent nitrogen, 6 to 8 percent phosphoric acid and 4 to 6 percent potash are the most widely used. From 40 to 50 percent of the nitrogen should be derived from an organic source. Organic nitrogenous materials commonly used are tankage, dried blood, cottonseed meal, fish scrap and castor pomace.

The number of applications varies from one to three or more annually. If all of the fertilizer to be applied is given in one application, it should be made in the spring. It is likely, though, that two applications per year is the most common practice, and, when this is done, the first is made in early spring and the second in mid-summer. When three are given, the last application is made in the fall. The fall application should be omitted in the northern part of the state, as it might produce a flush of growth which would not have the time to harden up sufficiently before frost.

Shrubby borders, where the plants stand from a few inches to from three feet or more apart in cultivated ground, can best be fertilized by scattering the fertilizer thinly and evenly over the surface of the ground and then working it in with a rake.

It is difficult to make any definite recommendations in regard to the amount to apply, as this varies with the fertility of the soil, number of plants in a given area, the age and condition of the plants and kind of fertilizer used. For those who have had experience, no set rules are needed, as the fertilizer is given without any particular thought as to amount.

For those who lack this experience, it is suggested that, for fertile soils containing considerable clay and organic matter, from one to two pounds per 100 square feet be applied, and on infertile sandy soils low in organic matter that from three to four pounds be applied per 100 square feet.

Trees and shrubs standing in open ground should have the fertilizer applied in a zone which would have as its center a circle marked by the outer tips of the branches. It is only with very young trees and shrubs that the fertilizer should be placed close to the trunk, since most of the feeding roots are not there but spread throughout the soil to a distance greater than the width of the top. Here, again, the amount to apply will vary greatly with the age of the tree and fertility of the soil and may range from one to as high as 50 pounds or more per year. The same thing would hold true for shrubs except that the amount applied would be relatively much less.

The best way to fertilize trees and shrubs growing in lawns is by "plugging", otherwise, most of the fertilizer will be used by the lawn grass. The holes may be made with a crowbar or some similar instrument and should be a foot or more in depth, about two inches in diameter and from two to four feet apart. They are filled with the balanced mixture suggested above, bone meal, tankage or dried blood. The surface to be fertilized is the same as previously described and the holes should be spread equally over this area. The amount of fertilizer to be applied per plant should be distributed equally between the holes. Manures may be applied to large trees without injury to the grass by removing sections of sod and taking out the soil underneath to a depth of 10 to 12 inches; the hole is then filled with stable manure, firmly packed, and the sod replaced.

The organic matter content of the soil can best be maintained by the use of mulches. For this purpose compost, peat moss, leaf mold, muck and leaves may be used.

These recommendations apply to the mineral soils of Florida. When the planting is on muck lands, nitrogen may be much reduced or eliminated from the fertilizer, for such

soils are usually rich in nitrogen. However, phosphorus and potash are used liberally.

Most trees and shrubs are quite tolerant to a wide range of soil reaction and this tolerance is further increased by the presence of large amounts of organic matter in the soil. However, there are certain species of plants which are more specific in regard to their soil reaction requirements, as, for example, azaleas, Camellias and gardenia, which require an acid soil reaction for healthy growth. This condition can best be maintained by the use of large amounts of organic matter in form of compost, peat moss, leaf mold, muck and leaves. Where it is necessary to increase the acidity of the soil, aluminum sulfate or sulfur may be used. Aluminum sulfate should be applied at the rate of one-fourth to one-half pound per square yard, spread evenly over the soil and watered in. Sulfur should be mixed with the soil at the rate of two to four ounces per square yard and the soil watered. Aluminum begins to change the soil reaction immediately after application, while sulfur will take several weeks before it increases the acidity of the soil.

#### FRUIT INSPECTORS STILL ON THE JOB

Right up to the last minute, the Florida citrus industry is jealously guarding the reputation it established following the freeze for shipping only good fruit out of the state.

Latest development along this line is an order from Nathan Mayo, commissioner of agriculture, that all roadguard stations be kept open until it is certain no frozen fruit remains.

Commissioner Mayo, however, has not indicated just when he would close the stations. This will be dictated by circumstances, he said, in emphasizing that the stations would remain open just as long as necessary. Even if some of the stations are closed, he said, roving inspectors will be kept at work and any trucker with a load of damaged fruit may find himself confronted by an inspector.

The citrus commission requested Mayo to keep the stations open as long as necessary to keep frosted fruit off southern markets. The commissions' field men had learned it was said, that a number of truckers planned to take advantage of the closing of the stations by attempting to transport large quantities of questionable fruit to southern markets.

Mayo's response was immediate and emphatic, in assuring the com-

mission he was in complete accord with the suggestion.

#### OBSERVATIONS ON PROTECTION OF AVOCADOS FROM COLD INJURY

(Continued from page 13)

or otherwise disposed of so it will not catch fire.

(15) In the spring when all danger of cold is past, gather up and store the batting dross, stack wood near tree trunks out of the way, or haul to selected locations, and store thermometers and other equipment until the following winter.

Unless and until a grower is willing to go to the expense of properly preparing for a thorough job of firing, and will give close personal attention to all details and be ready to work extremely hard for long hours, under very trying circumstances, and with a determination to win at all costs, he had better leave grove firing to someone else, letting Mother Nature take her course and

saving himself the loss of sleep, comfort, money and the qualms of conscience which may come from a job poorly done.

#### TEST FRUIT BY X-RAY

New citrus testing equipment employing the X-ray principle, used for several months to separate fruit damaged by cold from quality fruit, was described as highly successful recently by the Elfers Citrus Growers Association.

The new device operates like a fluoroscope, testing each piece of fruit individually. Dry parts of the fruit appear white, while the juice is dark.

The new equipment, which cost \$4,000, has already paid for itself several times over by salvaging fruit, according to Association secretary A. H. Reppard, Jr.

Before the X-ray device was developed, damaged fruit was eliminated by a more or less hit or miss floating method.



#### A Florida Manufactured Product . . . Peculiarly Fitted To Remove Scale, White Fly and Other Florida Insect Pest Problems . . .

In addition to features common to ordinary spray emulsions, it possesses **EXCLUSIVE SPRAY ADVANTAGES** that are not to be found in other similar products . . .

As the result of filtering and other special processes used in its manufacture — **ORANGOL** is free from injurious compounds frequently found in certain mineral oils in common use . . .

**ORANGOL** is a permanent emulsion and will keep indefinitely — uniform in consistency — mixes readily in all waters and is used effectively in combination with other spray solutions . . .

**ORANGOL is the Perfect Emulsion for Florida Conditions Because It Is Made Only to Serve Florida Growers.**

**Orange Manufacturing Co.**  
Orlando, Florida

## Dowling Joins Jackson Grain Co.

Paul M. Dowling for some time past state representative of the manufacturers of Volck oil sprays and Orthro pest control products, on July 1st accepted a position as general field representative for the Jackson Grain Co., and will conduct service and sales work in behalf of his new connection.

Dowling left Florida several months ago to go to Elizabeth, N. J., but decided that Florida was too fine a place in which to live to stay away and took advantage of the opportunity mentioned above to return to this state.

Dowling is well known over the state and is well liked by the trade.

## THE WAR AND ITS EFFECTS UPON FOREIGN TRADE IN AGRICULTURE

(Continued from page 11)

responding period in 1938-39. On the other hand, all other farm exports combined decreased 28 percent in value during the same period. Notable decreases were tobacco, 61 percent; grains and flours, 50 percent; and fruits, 25 percent.

The primary cause for these widely divergent trends in exports of our agricultural commodities was the European War. Countries at war have assumed direct control over most trade and are discouraging all imports that are not considered abso-

lutely essential. Their supplies of American cotton were very low at the outbreak of the war, and the demand for this commodity has been abnormally heavy since it is used extensively in war materials. It is understood that very little cotton is being sold for export at the present time, however.

Now, let us examine briefly our imports. Total imports of all commodities increased 22 percent during the seven months beginning July 1, 1939, over the similar period of the preceding year. Agricultural imports increased at practically the same rate, or 20 percent. The rise in imports was closely associated with the rise in industrial activity in this country during the last six months of 1939. The most striking rates of increase for imported agricultural materials were wool, 143 percent;

feeds and fodders, 168 percent; sugar, 35 percent; cattle, 24 percent; hides and skins, 23 percent; and molasses, 22 percent, over the corresponding period of the previous year.

In summary, the war has greatly stimulated exports of certain types of non-agricultural products and of cotton and this increase in our export trade has increased the purchasing power of our industrial workers for farm products. On the other hand, it has practically closed a large number of our export markets for many of our farm products.

**GRAFTED AVOCADO TREES** of leading varieties, priced low. R. B. Rosentreter, Winter Haven, Fla.

**ALYCE CLOVER SEED.** Ripe and cleaned. Ideal cover and hay crop. Write for information. P. E. Snyder, Box 866, Lakeland, Fla.

**CHOICE Rough Lemon Seedlings** 6 to 20 inches high, \$10.00 per thousand. Olan Altman, Sebring, Florida.

**GROVE OWNERS ATTENTION—I** will exchange old established manufacturing concern doing splendid business for producing orange and grapefruit grove in good section free and clear of encumbrances. Value approximately \$75,000.00. Address A. J. SIMMS, Tampa, Fla.

**LARGE AND SMALL** orange groves for sale also acreage suited for citrus culture, dairying and general farming. Charlton & Associates, Valuation Engineers and Real Estate Appraisers, Ft. Lauderdale, Fla.

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# Soil Building Crops

By J. LEE SMITH, District Agent  
Florida Agricultural Extension Service

Who among us doesn't know that a potentially good milk cow that receives no feed will die, that she is no longer a good milk cow and gives but little milk if she gets little feed, and that she will give much milk if she receives plenty of feed? She feeds the children, the wife — yes, the whole family if she is fed properly.

We now speak of "fertilizing" fish — applying phosphate, potash, and nitrogen in the shallow waters around the edges of streams, ponds, and other bodies of water where fish feed. What we really do is fertilize the little plants so they may grow and feed the fish and produce more fish.

Here we have two illustrations of a fundamental principle that can be applied to soil. If the soil receives no feed, vegetable or animal matter, it dies. If but little feed is given it, it produces but little, but if it is fed well, it in turn produces well. Therefore, it feeds man well. Then, as it is fed, it feeds.

The earth needs feeding just as any animal needs feed if it is to be maintained and if it is to produce abundantly for the welfare of mankind.

We wonder how many growers have ever stopped as they plowed along and looked down upon the good earth and thought of what it might say if it could talk. It would say: "Man, I too, am alive. You are made up of some lime, phosphorus, iron, and other minerals and living things, and so am I. These many years I have been giving up an abundance unto you without complaint. I am doing and will continue to do my best. I am sure you are wondering why I am not doing as well for you now as I did in the past. Well, I am sick — I am sick with hunger. I am no longer filled with the essentials of life stored in my bosom for thousands of years by Mother Nature. By neglectful methods it has been taken from me. I have been robbed. I am starving. If I die, you die. Look at China, look at India . . . Yes, look at the wasted, idle abandoned lands, dotted with dilapidated homes and huts in many sections. Only as you feed me, will I feed you. Feed me nothing and I die; feed me little, and little can I give; but feed me well and I will give to you abundantly."

What a challenge to every grower!

And we wonder how many growers when looking over their land stop to think, "Here I must make my living. There is no other place to go. There are no more new lands for me to clear; there are no more green pastures out yonder. If my pasture is to be green it must be here. My family and I will live only as good as I am able to make this land yield its harvest. Then I will make this resolve: I may not be able to increase my acres but I can enrich them. I will feed them and help them yield a richer harvest."

To feed the soil, to make it more alive, to enrich it, to make it yield up a more abundant life, soil building crops are grown and turned into it. A soil-building crop does this by adding much needed vegetable matter to the land. It covers the land and protects it from the heavy rains which cause packing and leaching, it catches the plant food that is made available by the action of the rain, the sun, and the acids that are freed in the soil, and it adds nitrogen taken from the air if it is a legume.

Without this decayed or decaying vegetable matter the soil would be nothing more than the particles of earth as were broken from the rocks in the beginning. It holds the sand together and makes the clay particles stand apart, making the soil granulated. This enables the air to penetrate it deeper, breaking down the combination of plant food elements so the plants can use them. This granulated condition of the soil allows free water to drain out of it, yet the humus holds the soil moisture which is so essential to the life and production of the crops that grow on it. This humus provides food for the billions of helpful bacteria, fungi, and other organisms that give it life.

Every acre grown to corn in Florida should have one or more crops of legumes grown on it the same year, at the same time the corn is grown or after it. A mass of legume vegetation should go back to the land each year. Such practice may not build the soil, always, but it will at least maintain it. By hundreds of experiments conducted throughout the Southeast, when cowpeas, velvet beans or soy beans were planted in the middle at the "laying-by" time of corn, in the rows with the corn, or in alternate rows, it has been

shown that corn interplanted with legumes produced 29.1 bushels corn per acre at the beginning and after eight years the average was 28.3 bushels, the loss of only .8 of a bushel per year.

The corn in which no legume was planted produced 33.9 bushels per acre and after eight years the average yield was only 24.6 bushels, a loss of 9.3 bushels per year. Legumes planted among the corn came to be worth 8.5 bushels of corn per year, in addition to maintaining the soil, additional feed was produced. In this connection, may we add that peanuts hogged off were not included and only once was crotalaria included. It is known that neither peanuts hogged off nor crotalaria grown afterward will reduce very little, if any, the crop of corn with which they are grown and crotalaria will add more vegetable matter and more nitrogen when turned under than any other Summer legume known to Florida farmers. Corn, peanuts, velvet beans, and a volunteer crop of beggarweed or crotalaria can all be grown on the land the same year.

On other lands, where possible, velvet beans, crotalaria or other Summer legumes should be grown as a cover crop and turned into the land. Into a poor deep white sandy soil a good stand of velvet bean stubbles were turned under and corn yield was increased 4.35 bushels per acre, and when the whole growth of velvet beans were turned under the yield was increased 12.32 bushels of corn per acre.

Kudzu has never been given the consideration as a soil builder in Florida that it deserves. Any land that is suited to growing it and that does not have to be used in growing other annual crops, should be set to it. It will produce an abundant supply of good hay and help the soil at the same time. In an experiment at Auburn, Alabama, land retired to Kudzu for three years and then planted to corn showed wonderful results. A slight Kudzu growth increased the yield from 12 bushels to 30 bushels per acre, and a heavy growth increased it four-fold. The average corn yield for four years where Kudzu was grown was more than twice that from land where none was grown.

The wise farmer will feed his land so it may feed him.



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